

Sustainable Intensification of Maize-Legume Systems for the Eastern Province of Zambia (SIMLEZA) - Africa RISING (AR) Project

Planning and Evaluation Meeting Report

5-8 August 2014

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The Africa Research In Sustainable Intensification for the Next Generation (Africa RISING) program comprises three research-for-development projects supported by the United States Agency for International Development as part of the U.S. government’s Feed the Future initiative.

Through action research and development partnerships, Africa RISING will create opportunities for smallholder farm households to move out of hunger and poverty through sustainably intensified farming systems that improve food, nutrition, and income security, particularly for women and children, and conserve or enhance the natural resource base.

The three projects are led by the International Institute of Tropical Agriculture (in West Africa and East and Southern Africa) and the International Livestock Research Institute (in the Ethiopian Highlands). The International Food Policy Research Institute leads an associated project on monitoring, evaluation and impact assessment.

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**1. Introduction**

The Sustainable Intensification of Maize-Legume Systems for the Eastern Province of Zambia- Africa Research in Sustainable Intensification for the Next Generation (SIMLEZA-AR) project aims at leveraging science for sustainable productivity growth, intensification and diversification of maize based systems in the region through new varieties, improved agronomic practices, legumes integration, and improved access to markets and services. The project focuses on eastern province of Zambia under the Feed the Future (FTF) zones of influence where small-scale farmers depend on maize-legume mixed systems for their livelihood. The eastern province is characterized by low productivity, extreme poverty, poor soil fertility and environmental degradation. The project is being funded by USAID under FTF and is jointly managed and implemented by IITA and CIMMYT in collaboration with the national partners-Zambia Agriculture Research Institute (ZARI), Golden Valley Agriculture Research Trust (GART), University of Zambia (UNZA), extension agencies, NGOs, seed companies and input suppliers. The SIMLEZA-AR project Annual Evaluation and Planning Meeting was held from 6th to 8th August, 2014 at Protea Hotel in Chipata. The main agenda of the meeting was to share the 2013/14 cropping season results and experience, and develop work plans for 2014/2015 season.

The meeting was attended by stakeholders drawn from Ministry of Agriculture and Livestock (MAL), Total Land Care (TLC), Zambia Agriculture Research Institute (ZARI), seed companies, University of Zambia, USAID, Africa RISING, CIMMYT and IITA (*see Appendix 1*). Project activities were implemented in seven agricultural camps spread across Chipata, Katete and Lundazi districts of the Eastern Province. Activities conducted during 2013/14 cropping season included (a) carrying out adoption surveys in target communities and economic analysis of on-farm trials and market value chain study by Objective 1; (b) conducting on-farm and on-station conservation agriculture and soybean agronomy validation trials under Objective 2; (c) facilitating innovation platform meetings for project stakeholders under Objective 2; (d) conducting farmer-to-farmer exchange visits, field tours, field days, technology evaluation meetings under Objective 2; (e) training farmers, extension officers and other stakeholders on soybean processing under Objective 3; (f) conducting on-farm and on-station legume and maize variety trials, breeders seed production of drought tolerant maize varieties, and backstopping seed companies on seed production under Objective 4; (g) under objective 5 the following activities were carried out, training of farmers, community volunteers and extension agents before and during 2013/14 cropping season; (h) data collection and writing up thesis by four MSc. students who joined the project in 2012. During the meeting results from activities conducted under each objective were presented and discussed, and solutions to challenges encountered in 2013/14 season were identified. Work plans for 2014/15 season were developed for each objective and responsibilities were assigned to the different project stakeholders.

**2. *Day 1 (Wednesday 6 August 2014): Data analysis and preparation of presentations***

The main focus of the first day was to analyze the data from the 2013/14 season and prepare presentations to be shared with project stakeholders on the second day of the meeting (*see Plate 1*). Each objective developed a summary of their achievements and highlights in 2013/14 cropping season.

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Plate 1. Team members of each project objective analyzing data and preparing presentations

***3. Day 2 (Thursday, 7 August, 2014): Presentation of results and highlights by each objective team***

The second day consisted of project progress presentations by objective as outlined below.

***3.1. Objective 1:*** *Monitoring Adoption Survey – By Fredrick Mwansa*

The survey was done in the target district namely Lundazi, Katete and Chipata.

The main issues that were raised in this presentation included:

* Lundazi had the highest intensity of adoption. Note that intensity refers to the land allocated to a given crop and is one way of defining adoption.
* The farmer crop variety preference was as follows:
  + Maize: Pan 53
  + Soybean: Lukanga
  + Cowpea: Msandile
* The reasons for non-adoption included lack of seed and lack of skill to use the technologies
* Farmer’s willingness to pay for seed were dominated by the following varieties: Magoye for soybean, IT82-E-16 and Msandile for cowpea.
* In terms of sharing, there was more sharing of knowledge on soybean and more sharing of cowpea seed.

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* It was reported that the value chain analysis was done as a way of checking the market access.
* In order to note the constraints literature review was done and primary data collected. Further constraints were identified in Chama and these were crop based.
* Host farmers increased their hectarage beyond the demonstration plots but there was no expansion beyond the target groups. It was therefore noted that there is need to make a follow up on the spillover effects of the project.
* Constraints included shortage of seed for gapping and low profits on crop yield from small crop fields.
* It was noted that all farmers within the target areas are identifiable

***3.2. Objective 2:*** *Adoption and adaptation of productive, resilient and sustainable agronomic practices*

*1. Katete District by Ziko Kahenge*

The project activities were carried out in two camps namely Kawalala and Kafumbwe agricultural camps.

* There were no significant differences in the cowpeas among the different methods.
* In Kawalala, the Maize- Soybean rotation had slightly higher yield.
* In terms of soybean yield, a lot of differences were observed mainly due to differences in management practices. Some farmers planted earlier and weeded on time as compared to others.
* In terms of maize yields, higher yields were observed from maize rotated than maize continuous system.
* Some of the successes included: recruitment of two secondary farmers, establishment of on-farm trials, and delivery of inputs on time, conducting two field days and conducting a steering committee meeting.
* It was recommended that farming systems to be used by farmers needed to be explained to them to reduce on the yield differences mainly being attributed to management.
* Apart from management, different soil types (some inherently poor) could have also affected the yield variations among farmers.
* The crop rotation trials especially those in their first year did not show any differences in crop performances though minimal differences were obtained for those in their second year of rotation.
* The soybean rotation was observed not have shown any significant differences.
* The take home message was the need for recommending to the farmers the farming systems to use for example promoting intercropping of soybeans and maize as there is consistent increase of yield.

*2. Chipata District by Hachibone Chisamu*

The project is carried out in three camps namely Chanje, Mtaya and Kapara.

* In the CA trials, Maize yields were higher from the Dibble stick trial in the Chanje second year rotation trial. The issues of drudgery as a result of the dibble stick were raised and farmers preferred if possible a direct seeder.
* High yields were attained in the cowpea trial for the farmer who planted late due to plant diseases escape.
* Successes included the following:
  + Hosted six chiefs in the March 2014 field day.
  + Conducted field study tour by USAID entourage.
  + Inputs received on time.

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* + Timely data collection.
* Challenges included the following:
  + Market unavailability for legumes especially cowpea.
  + *Striga* weed in legume trials.
  + Labour constraints in legume trials
  + Residual effect of bullet herbicide on legumes affects growth.
  + Inadequate monitoring of trials by extension officers.
  + Delayed funding from IITA.
* Feedback from farmers
  + Beans should be included in the trials.
  + Poor germination of maize.
  + Increased adoption of CA and soybean agronomy technology.
  + There is demand for seed especially cowpea from non-participating farmers attending field days.
* Cowpea market is available but there are no farmer organizations in terms of marketing.
* The gross margin analysis for soybean was not done because there was no yield data and no cowpea data for comparison.
* Take home message for farmers: Farmers should learn the new technologies, adopt them and expand using the technologies tested. The specific technologies include: rotation of cowpea and maize, use of inoculum in soybean agronomy.

*3. Lundazi District by Lubanze Holmes*

CA trials under Lundazi were conducted in Vuu.

* It was advised that farmers need to be told that maize-cowpea benefits them.
* The yield under the maize –soybean rotation under the soybean nutrition management were as follows:
  + For soybean and maize, the highest yield was obtained from the soybean + Inoculum + Fertilizer trial.
* Some of the successes included: pre- season training for farmers, establishment of on-farm and on-station trials, and delivery of inputs on time, conducting field tours and field days in both camps and facilitated innovation platform.
* Some of the challenges included: dry spells, missing data as 2 farmers did not plant, diseases, insects, pests infestation on cowpea and soybean fields, heavy *Striga asiatica* on the control treatments, Limited seed for gapping/replanting.
* It was reported that Agro-dealers feel alienated from SIMLEZA because the project does not buy the inputs from them.
* It was noted that yield differences among the farmers were mainly due to management as well as differences in terms of soil type.
* The need for a discussion on the release of new seed varieties was stressed.

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*4. Innovation systems work in SIMLEZA-AR by Jens Andersson*

The emphasis was that there is need to shift focus from technology development to technology delivery. The feedback mechanism from farmers include the following points:

Participatory Variety Selection.

1. On- farm trial evaluations.

The above are done in order to improve the feedback from farmers to research

* A concern relating to the type of legumes being used (cowpeas and soybeans) to the exclusion of others in the project was clarified. This was based on the type of legumes on the market as well as the fact that IITA promotes them too.

*5. On-Station CA Trials by Mwila Mulundu*

The SIMLEZA-AR on station research trials include the following:

1. Doubled- up Legume Trials: For evaluation of different combinations of legumes to increase the land equivalent ratio to CP and CA systems.
2. Weed Control Strategies Trial:For evaluation of different combinations of weed control strategies to reduce on crop-weed competition.
3. Residue levels trial: For evaluate the effects of different residue levels on maize growth and yield, weed pressure, soil organic matter and nutrient patterns
4. Expanded Step Trial:For evaluation of effects of various components of CA systems on crops.

*Lessons Learnt:*

* Pigeon pea yielded better when intercropped with groundnuts.
* Although groundnuts do better under conventional system, intercropping gives it competitive advantage under CA system.
* From the residue levels trial, it was concluded that 2ton/ha of residues were sufficient

*6. Regional long term CA trials by Christian Thierfelder.*

The regional trials are being carried out in Malawi, Mozambique, Zambia and Zimbabwe. The trials use the cropping systems that are common in the southern Africa region.

The presentation highlighted the following issues:

* It is predicted that temperature increase of about 2.6oC in the next 40 years
* CA is not only important for maize and cowpea but also for cash crops such as cotton
* a positive trend in CA response overtime in challenging environments
* rotations outperform the continuous

*7. IITA on-farm and on-station trials by Setegn Gebeyehu*

* On-Farm Trials
* 298 farmers were involved in the on farm trials.
* A total of 1693 farmers attended field days.
* On-Station Trials

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These included the following:

* Soybean Inoculation and Fertilizer management
* Lukanga and TGx 1740- 2F were used.
* Soybean used with inoculants and inorganic fertilizer yielded more
* Spacing of 30cm/1 seed seemed to be performing better
* Compatible maize cowpea intercropping

-Sudan 1 and Bubebe showed best compatibility.

* Effect of variety and proportion of component crops on performance of sweet potato - soybean intercropping.
* The 100% SWP + 50% SYB and 50% SWP + 50% SYB are the most promising treatments.
* Determination of optimal agronomic practices for soybean production under CA

-Safari performed consistently across different CAs i.e. Traditional, Dibbling and Ripper.

- Lukanga performed better under traditional land preparation.

* The need for the development of seeds that can perform under CA was stressed.
* In total, 8 treatments that were presented are classified as technologies that need to be promoted
* Due to the *Striga* infestation, the cowpea was the main crop attacked and this was only observed when intercropped.

*Lesson Learnt:*

* The conclusion from the presentation was that application of an inoculum and inorganic fertilizer be encouraged as the soils are not sufficient in N and P.

***3.3. Objective 3:*** *Soybean Utilization at household level*

The presentation considered the various activities that are being done under this objective and these include:

* Analysis of survey data.
* Adapt/design nutrition education.
* Introduce and validate new soybean products at house hold level.

The meeting was informed that a draft recipe book was being developed and it can be accessed by those who are interested.

It was noted that the recipes developed should be synthesized into bulletins or pamphlets to make it easy to scale-up the developed recipes. Of importance is not how much is adopted but how much is consumed by children under 5 years.

* It was noted that there is a multi-sectoral committee present in Lundazi which is collaborating with this project on promoting the utilization of soybean
* It was noted that the males were not included in the activities and there should be included as they are part of the household.

***3.4. Objective 4.*** *Breeding for stress tolerant maize and legume varieties in Zambia*

*1. Presentation by Mathias Zulu*

The seed systems component for legumes and delivery was presented by IITA. The breeder (Mr. Zulu). Soybean National Trials were carried out in 5 locations and all the sites had good results except Misamfu. Cowpea trials were also planted at three locations. Three soybean genotypes were submitted for pre- release to SCCI (TGx 1740-2F, TGx 1937-1F, TGx 1904-6F).

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*2.* *Presentation by Peter Setimela*

The activities under maize seed systems included Advanced Maize Trials, Regional Maize Trials, and on-farm variety testing. The highlights of the presentation included the following:

* On-farm and on- station trials were carried out in 3 districts and GART
* Early, medium and late maturing maize hybrid and OPV trials were carried out in Msekera and GART.
* Twenty elite maize varieties were evaluated under CA with the objective to identify suitable varieties that perform well under CA and conventional systems.
* Twelve varieties were also evaluated on-farm using the mother baby trials approach and the following hybrids were selected by the farmers ZARICZH113, CZH0811, ZARICZH113, CZH132019Q and ZARICZH811
* Three drought tolerant maize hybrids and one OPV were submitted to SCCI and are expected to release this coming season
* 3000 seed packs of newly released drought tolerant maize varieties were distributed to Steward and unity seeds as part of variety promotion.
* Breeders and foundation seed production of newly released varieties were produced at GART and NANGA to support SMEs.
* Four scientist spent 2 weeks at CIMMYT Zimbabwe to learn about pollination techniques and hybrid seed production.
* Maize technician was held in Lusaka for week. The training highlight elements of seed production, trial management, seed marketing, and breeding for abiotic stress.

***4. Day 3 (Friday 8 August, 2014) - Discussion on challenges encountered in 2013/14 season and developing work plans for 2014/15 season***

The focus of the third day was on discussing challenges faced in 2013/14 season and propose solutions for each challenge, and develop work plans for 2014/15 season. A presentation on USAID target indicators was made by Munyaradzi Mutenje and it was noted that there was need to segregate data sets into gender, new and old farmers participating in the project activities. The presentation highlighted that there is need to revise the targets of different indicators in line with the budget that was reduced in the second year of the project.

The problem areas and proposed solutions are highlighted in the Appendices 2 and 3. The meeting was a success as the main aim of sharing results and experiences, and developing work plans was achieved. In the closing remarks, participants were thanked for actively participating in the various activities conducted in 2013/14 cropping season. Dr. Bekunda reminded project stakeholders that “*what has not been written has not been done*.” This was to stress the importance of keeping records of all activities and operations done during implementation of the project. Mr. Harry Ngoma expressed his gratitude for the continued support from the USAID and Africa RISING. The meeting was officially closed by Ms. Naomi Kamanga of IITA (*see Plate 2*).

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Plate 2. Ms. Naomi Kamanga of IITA officially closing the SIMLEZA-AR

Planning and Evaluation meeting

**Appendix 1: List of participants of the SIMLEZA Planning and Evaluation meeting held at Protea Hotel, Chipata, August 2014**

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|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
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Appendix 2. Challenges on technology adoption and marketing of crops grown using the project technologies

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **PROBLEM** | **DESCRIPTION** | **ACTION TOWARDS SOLUTION** | **BY WHOM** | **BY WHEN** |
| Poor adoption of technologies by farmers | Adoption of technologies by farmers on their own field is poor | * Improve farmer linkages to markets * Increase the number of CA equipment (Ripper) * Need more research to understand why farmers are not adopting | * Innovation platform * CIMMYT * CIMMYT/IITA | * All season * End of October together with inputs for next season |
| Gender differences in markets need to be better understood | Mistrust between husband and wife on the use of family income | * Improve communication between CEOs and farmers * Encourage farmers to use the household approach when selling produce | * MAL (CEOs) * Traditional leaders | * All season |
| Legume markets for seeds | * Seed multipliers are getting stuck with their seed after packaging * Farmers are also failing to find markets for their grain | * Through the IPs, the project should help farmers to enter into contract farming of seed | * Innovation platform * CIMMYT/IITA | * Before the season |
| Bulking of legumes | Mistrust among farmers leads to failure to bulk their grain | * Exchange visits to groups/areas that are successfully bulking grain | * DACOs office | * March 2015 |
| No feedback of trial data/Key messages to districts | No feedback to districts on trial results/Key messages to district, camp, farmers | * Need to simplify and summarize the data results and Key messages * Have meetings with farmers | * CIMMYT/IITA * DACOs office | * September 2014 * October 2014 |
| Out scaling not yet large enough | Technologies are not being out scaled by host farmers and the surrounding farmers | * Organize meetings with host farmers to understand why they/surrounding farmers are not out scaling | * CEOs | * October 2014 during pre season meetings |

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Appendix 3: Biophysical challenges faced by farmers and extension officers in 2013/14 cropping season

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **PROBLEM** | **DESCRIPTION** | **ACTION TOWARDS SOLUTION** | **BY WHOM** | **BY WHEN** |
| Farmers ask why soya agronomy trials are on ridges | Farmers are trying to find out | * Need to do both systems | Christian (CIMMYT) and Setegn (IITA) | Immediately |
| Activities under Objective 3 were limited | Activities were limited due to lack of funds | * IITA to negotiate for funding | Busi - IITA | Immediately |
| On-station trials are under-staffed | Poor data quality from Msekera trials | * Assign another person | Christian - CIMMYT | Immediately |
| Data sharing within SIMLEZA-AR project | Data sharing | * Team to work together | Christian, Peter & Mathias | Immediately |
| Variations in results from the same camp | High variability from site to site within the same camp | * Intensify monitoring | Senior Agriculture Officers | October 2014 to May 2015 |
| Poor germination of DK 8053 | Poor germination | * Germination tests * Increase seed quantities to farmers | SCCI, ZARI, Senior Agriculture Officers | October 2014 |
| Publications | Not done | * Team to work together | Christian, Peter & Mathias | Immediately |
| Soya after maize affected by Bullet | Soya after maize affected by Bullet | * Apply correct rates | Camp extension officers | At seeding time |

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